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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,780	06/20/2000	Alessandro Cesare Callegari	YOR-9-2000-0010	6159

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EXAMINER

NGUYEN, HOAN C

ART UNIT PAPER NUMBER

2871

DATE MAILED: 09/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/597,780

Applicant(s)

CALLEGARI ET AL.

Examiner

HOAN C. NGUYEN

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 22 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 and 22-36 is/are pending in the application.
- 4a) Of the above claim(s) 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-20 and 22-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

Applicant's arguments with respect to Amended claims 1, 3, 9, 30-31 and New claims 34-36 have been considered but are moot in view of the new ground(s) of rejection. Therefore, this is Final action.

Applicant cancelled claim 21.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1-20 and 22-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Limitation "dry deposited liquid-crystal alignment layer" and limitation "said dry deposited alignment layer" should not be different layers. Therefore, "dry deposited liquid-crystal alignment layer" should be "said dry deposited layer." Applicant is advised to correct this error throughout specification and claims for consistency.

Limitation "said material" in claim 3 and 12 is lack antecedent basis.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-3 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Callegari et al. (US6061114A).

Callegari et al. teach (Figs. 2 and 9) a method of preparing a multi-domain dry deposited liquid-crystal alignment layer, by a method of mechanical mask (col.6 lines 24-49);

wherein

- said dry deposited liquid-crystal alignment layer (col. 3 lines 10-15 and col. 12 lines 20-23) is exposed to a particle beam;
- said particle beam is directed at said dry deposited liquid-crystal alignment layer at an adjustable angle with respect to said dry deposited liquid-crystal alignment layer;

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- masking said dry deposited layer with features to align a local area, thus leading to fabricate multidomain alignment, thereby masking said dry deposited layer into domain areas (first and second...) according to claim 2;
- said dry deposit layer material is selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof according to claim 3;
- an particle beam in directed at the dry deposited aliment layer with pretilt angle greater than 2.5 degrees, which should cover the range from about 10 to about 20 degrees, for good display characteristics (col. 8 lines 55-60) according to claim 34.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhari et al. (US6124914A) in view of Callegari et al. (US6061114A).

In regard to claims 1, 4-5, Chaudhari et al. (Fig. 9B, col. 5, lines 57-63) teach the photoresist method comprises:

- depositing an polymer alignment layer of on electrode made of a transparent conductive layer (col. 1 lines 40-42);
- partitioning the polymer alignment layer into first domain areas and second domain areas of the polymer alignment layer as shown in Fig. 8;
- bombarding the polymer alignment layer with first ion beam; thereafter covering the first domain areas of the polymer alignment layer with a mask (Fig. 9B) leaving the second domain area open;
- bombarding the second domain areas with a second ion beam; and
- removing the mask.

In regard to claim 6, Chaudhari et al. (Fig. 9A, col. 5, lines 49-52) teach the photo-resist method, wherein the step of covering comprises the step of applying a layer of photo-resist.

In regard to claim 7, Chaudhari et al. (col. 6. lines 20-36, Fig. 14) teach a method of preparing a multi-domain; wherein the UV treatment method comprises:

- depositing (implicitly) an polymer alignment layer of on electrode made of a transparent conductive layer;
- partitioning the polymer alignment layer into first domain areas and second domain areas of the polymer alignment layer;
- selectively exposing one of the first and second domain areas to UV light; and
- bombarding both the first and second domain areas with an ion beam in a single direction to produce in non-UV exposed domain areas a pretilt angle different from the areas that were exposed to UV light.

However, Chaudhari et al. fail to disclose the alignment layer made of a dry deposited layer (not polymer layer) and feature of claim 34.

Callegari et al. disclose (a) the alignment layer made of a dry deposited layer with materials of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) for less manufacturing step and cost (col. 43 lines 35-61);

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a photoresist method as Chaudhari disclosed with (a) the alignment layer made of a dry deposited layer for less manufacturing step and cost.

4. Claims 1, 8 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colgan et al. (US6256080B1) in view of Callegari et al. (US6061114A).

Colgan et al. (Fig. 4) disclose as a prior art a method of preparing a multi-domain; wherein a ridge and fringe field method comprises:

- providing a top substrate 27 having a surface;
- providing a color filter 23 on the top substrate;
- providing a transparent conductive layer 28 disposed over the color filter 23, wherein a transparent conductive layer 28 is made of ITO (same as Fig. 2), which is well-known material to form the electrode (col. 2, lines 38-40);

- building a polymer ridge 10 on the transparent conductive layer on the color filter;
- depositing an alignment layer on a surface of the transparent conductive layer and the ridge (col. 3 lines 34-40).

However, Cogan fails to disclose (a) the alignment layer made of a dry deposited material; (b) bombarding the dry deposited layer with an ion beam under condition to produce a low pretilt angle.

Callegari et al. disclose (a) the alignment layer made of a dry deposited material for less manufacturing step and cost; (b) bombarding the dry deposited layer with an ion beam under condition to produce a low pretilt angle (col. 8 lines 52-64) for good display display.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify Colgan et al. disclosed with (a) the alignment layer made of a dry deposited material for less manufacturing step and cost; (b) bombarding the dry deposited layer with an ion beam under condition to produce a low pretilt angle (col. 8 lines 52-64) for good display display.

5. Claims 9-20, 22-25, 29-30 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhari et al. (US6124914A) in view of Callegari et al. (US6061114A).

In regard to claim 10, Chauhhari et al. teach (Fig. 9B) a multi-domain, wide viewing angle liquid-crystal display, wherein the domains of the first and second alignment layers are obtained by mechanical mask method.



In regard to claim 11, Chaudhari et al. teach (Figs. 8- 9) a multi-domain, wide viewing angle liquid-crystal display, wherein the mechanical mask method comprises

- depositing on a substrate a material to form a transparent alignment layer 30/32;
- masking the alignment layer into first domain areas and second domain areas of the alignment layer or domains of alignment layer at selective local area;
- selectively bombarding the alignment layer with an ion beam through the mask.

In regard to claim 13, the LCD wherein the beam ion is provided from source of Argon (Fig. 1, col. 4, lines 1-19).

In regard to claim 14-16, Chaudhari et al. teach (Fig. 8) a multi-domain, wide viewing angle liquid-crystal display, wherein each of pixels have first and second domains, which have a different ion bombardment direction (col. 5 lines 26-53);

In regard to claim 17, Chaudhari et al. teach the a multi-domain LCD, wherein the liquid crystal material is selected from the group consisting of a liquid crystal having left-handed chirality, having right-handed chirality, and having no chirality (col. 6, lines 2-16)

In regard to claims 18-20, Chaudhari et al. (col. 7, lines 21-42) teach a multi-domain LCD, which are obtained by the photoresist method comprising:

- depositing (implicitly) an polymer alignment layer of on electrode made of a transparent conductive layer;
- partitioning the polymer alignment layer into first domain areas and second domain areas of the polymer alignment layer;

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- bombarding the polymer alignment layer with first ion beam; thereafter covering the first domain areas of the polymer alignment layer with a mask (Fig. 9B) or photoresist (Fig. A) leaving the second domain area open;
- bombarding the second domain areas with a second ion beam; and
- removing the mask.

In regard to claims 22-23, Chaudhari et al. teach a multi-domain LCD, wherein the domains of first and second alignment layers are obtained by UV treatment (col. 5 lines 20-26)

In regard to claims 24-25, Chaudhari et al. teach (9A-B) a multi-domain LCD, which are obtained by the UV treatment method comprising further:

- depositing (implicitly) an polymer alignment layer of on electrode made of a transparent conductive layer;
- partitioning the polymer alignment layer into first domain areas and second domain areas of the polymer alignment layer;
- selectively exposing one of the first and second domain areas to UV light; and bombarding both the first and second domain areas with an ion beam in a single direction to produce in non-UV exposed domain areas a pretilt angle different from the areas that were exposed to UV light (col. 7, lines 21-41) according to claim 24;
- or it is obvious to reverse the process: selectively bombarding both the first and second domain areas with an ion beam in a single direction; and exposing both first and second domain areas to UV light to produce in said non-bombarded

domain areas a pretilt angle different from the area that were bombarded with ion beam (col. 6, lines 30-36) according to claim 25.

However, chadhari et al. fail to disclose the elements in claims 9, 12 and 29 and features of claims 35-36.

It is conventional art that a multi-domain, wide viewing angle liquid-crystal display comprising all elements in claims 9 and 29-30 excepting an alignment layer made of the dry deposited alignment layer.

Callegari et al. teach (Figs. 4 and 9) a multi-domain, wide viewing angle liquid-crystal display, wherein

(a) the alignment layer is formed by the dry deposited alignment layer, which is made of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) for less manufacturing step and cost (col. 43 lines 35-61) according to claims 12;

(b) an particle beam in directed at the dry deposited alignment layer with pretilt angle greater than 2.5 degrees, which should cover the range from about 10 to about 20 degrees, for good display characteristics (col. 8 lines 55-60) according to claims 35-36.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify Chadhari et al. disclosed with (a) the alignment layer formed by the dry deposited alignment layer made of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) for less manufacturing step and cost; (b) an particle beam in directed at the dry deposited alignment layer with pretilt angle greater than 2.5 degrees, which should cover the range from about 10 to about 20 degrees, for good display characteristics.

6. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohe et al. (US5949509A) in view of Callegari et al. (US6061114A).

In regard to claim 31, Ohe et al. (Figs. 1-6) teach a wide viewing angle in-plane switching mode LCD comprising:

- a bottom polarizer 8a;
- a bottom substrate 7a;
- a top polarizer 8b;
- a top substrate 7b;
- a color filter layer 22 disposed over a surface of the top substrate;
- a plurality of common electrodes 1 disposed in the bottom substrate plane and a plurality of pixel electrodes 4 disposed in a staggering relationship therewith to form a comb-like structure (Fig. 6A) for producing an electric field 9 parallel to

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plane of the bottom substrate so that when operated, the molecules of liquid crystal material are switched to rotate by the vertical electrical field in direction parallel to the substrate surface;

- a first alignment layer 5a over bottom substrate and comb-like electrodes;
- a second alignment layer 5b over the color filter, the second dry deposited liquid crystal alignment layer being spaced adjacent to and facing the first dry deposited liquid crystal alignment layer;
- a liquid crystal material disposed in the space therebetween;

In regard to claim 33, Ohe et al. (Figs. 1-6) teach a wide viewing angle in-plane switching mode LCD, wherein each of common electrodes on one end 1a is in communication with storage capacitor and another end with TFT as Fig. 6A and 6C shown.

However, Ohe et al. fails to disclose

- said dry deposited liquid-crystal alignment layer is exposed to a particle beam; and said particle beam is directed at said dry deposited liquid-crystal alignment layer at an adjustable angle with respect to said dry deposited liquid-crystal alignment layer.
- The features in claim 32.

Callegari et al. teach (Fig. 1, col. 42-61) a wide viewing angle in-plane switching mode LCD, wherein

- the dry deposited alignment layer is exposed to a particle beam; and said particle beam is directed at said dry deposited liquid-crystal alignment layer at an adjustable angle with respect to said dry deposited liquid-crystal alignment layer for non-contact alignment method with low cost (col. 1 lines 58-64).
- treating a dry deposited alignment layer with an ion beam in direction with pretilt angle greater than 2.5 degrees, which should cover the range from about 10 to about 20 degrees, for good display characteristics (col. 8 lines 55-60).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a wide viewing angle in-plane switching mode LCD as Ohe et al. disclosed with (a) the dry deposited alignment layer is exposed to a particle beam; and said particle beam is directed at said dry deposited liquid-crystal alignment layer at an adjustable angle with respect to said dry deposited liquid-crystal alignment layer for non-contact alignment method with low cost; (b) treating a dry deposited alignment layer with an ion beam in direction with pretilt angle greater than 2.5 degrees, which should cover the range from about 10 to about 20 degrees, for good display characteristics.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (703) 306-0472. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SIKES L WILLIAM can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-8178 for regular communications and (703) 308-7724 for After Final communications.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

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HOAN C. NGUYEN  
Examiner  
Art Unit 2871

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September 17, 2002



TOANTON  
PRIMARY EXAMINER